Competitiveness of Mango Fruit Exports

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ABSTRACT

This study was intended to determine the problems facing Sudanese mango fruit exports. It concentrated on mango exports competitiveness in international markets and on the main economic factors affecting this competitiveness. Primary data were collected by interviewing mango producers and exporters in Abu Halima village (East Nile Locality, Khartoum State) and the Khartoum central market, during 2005-2012 seasons. Secondary data were obtained from different relevant sources. The data were analyzed by descriptive statistics and policy analysis matrix. This provided access to estimate the private and economic profitability of mango exports in the Sudan and to determine the effects of taxation policies. The results revealed that mango is highly competitive in foreign markets, and the government policies highly taxed mango crop throughout the study period (2005-2012). The Domestic Resource Cost (DRC), Coefficient of International Competitiveness (CIC) and International Value Added indicators were used to determine the competitiveness of mango exports and found to be about 0.02, 0.04 and 8237 US$, respectively, in season 2012. For improvement of mango exports, the study recommended the removal of export constraints, e.g. reducing the government taxes and fees on mango export so as to increase its competitiveness and reduce cost of air transport and study the possibility of using sea ports.

Key words: Mango; competitiveness; international markets; policy analysis matrix; DRC; CIC; IVA

INTRODUCTION

In the Sudan, mango is an important horticultural crop. In fact, Sudan has comparative advantage in production of mango crop as it is endowed with rich natural resources (fertile land and enough water) and does not use chemicals. Mango is considered the first fruit crop for export, the value of exported mango is very small compared to production potential. In 2012, the mango share was 34.02% of value of fruits export, 23.63% of vegetables and fruits exports and 0.55% of the value of agricultural exports. Mango can be processed, because large and regular supplies are available, it is suitable for making paste, juice, fruit salad and other processed products to meet the high demand for processed products in foreign markets.

Problem statement: The percentage share of exported mango decreased among the exported fruits during the last four years, because mango is facing complex problems, such as poor quality of produce, high costs of air freight, high cost of service fees and

taxation and competition with other countries .The mango share was 99%, 46.7%, 27.9%, 26.1% and 24.7% of the volume of fruit exports in 2008, 2009, 2010, 2011 and 2012, respectively.

Objectives:

1. To determine the competitiveness of mango exports.
2. To test the impact of the production (inputs) and marketing costs on mango competitiveness.
3. To estimate the impact of the government policies on the competitiveness of mango exports .

METHODOLOGY

This paper used the policy analysis matrix (PAM) technique to examine the Sudanese mango competitiveness. Under open market conditions, Sudan can produce goods and services that meet the taste of foreign consumers while simultaneously maintaining and expanding domestic real income (Wiggnaraja, 2000).

PAM is designed to reflect the existing situation and to demonstrate empirically the relationships among different policies and market failures. PAM is an accounting frame work which disaggregates the economics of the commodity into its sources of private and social profitability. Since policies can affect both input and output markets, PAM can be used to detect sources of policy transfer and resource allocation inefficiency and measure their cumulative effect on the commodity system. Some PAM coefficients are used as competitiveness indicators; namely, the international value added (IVA), the domestic resource costs (DRC) and the coefficient of international competitiveness (CIC). The first task in constructing PAM is to select the representative agricultural or commodity system (production, marketing, processing, domestic consumption and exports). Then, the budget data on each activity of the system are collected (input costs and output revenues). These inputs and outputs are valued at market prices (input prices) to yield actual private profit. The same inputs and outputs are re-evaluated using social prices (world prices for tradable inputs and outputs and accounting prices for domestic factors) to yield social costs and profit. The comparison between private and social costs on one hand and between private and social profits on the other, yield the basic result of PAM.

The private valuations can diverge from the social valuation because of one of two reasons. The first is the category of market failures factor, market imperfections and monopolies. The second is the existence of distorting government policies.

The private prices can be collected from primary or secondary sources. The term private refers to observed revenues and costs reflecting actual market values received or paid by farmers, merchants or processors in the agricultural system. The private or actual

market prices thus incorporate the underlying economic costs and valuations plus the effects of all policies and market failures that create transfers in the system. The social valuation is divided into social valuations of tradable and non tradable inputs and outputs. For tradable outputs and inputs, the social valuation are given by world prices, CIF import prices for goods and services in local currency plus additional internal cost items valued at accounting prices to get import parity price or FOB export prices converted into local currency. Figures I and 2 are schematic diagrams for calculations of import and export parity prices.

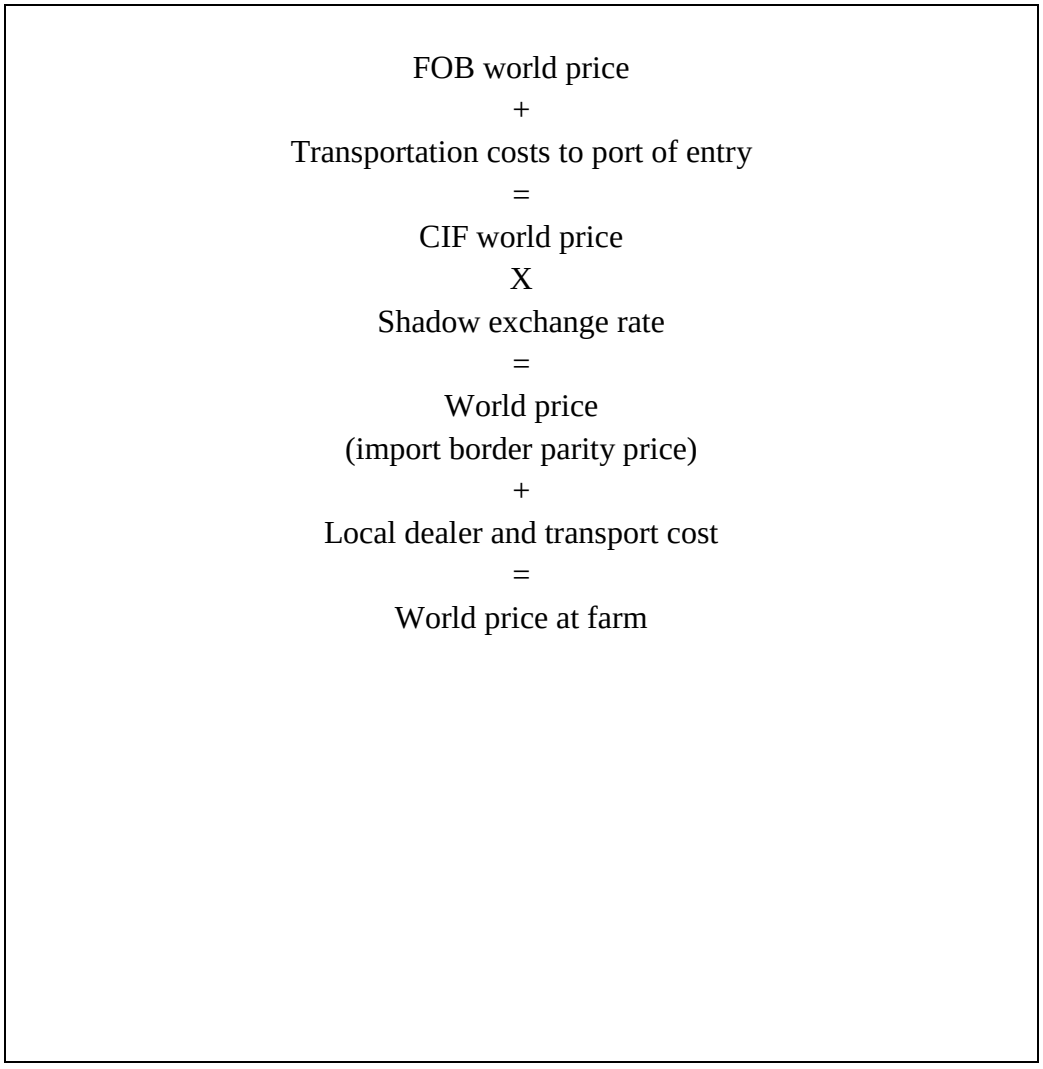

Fig. **1**. The import parity price
Source: Idris (1993)

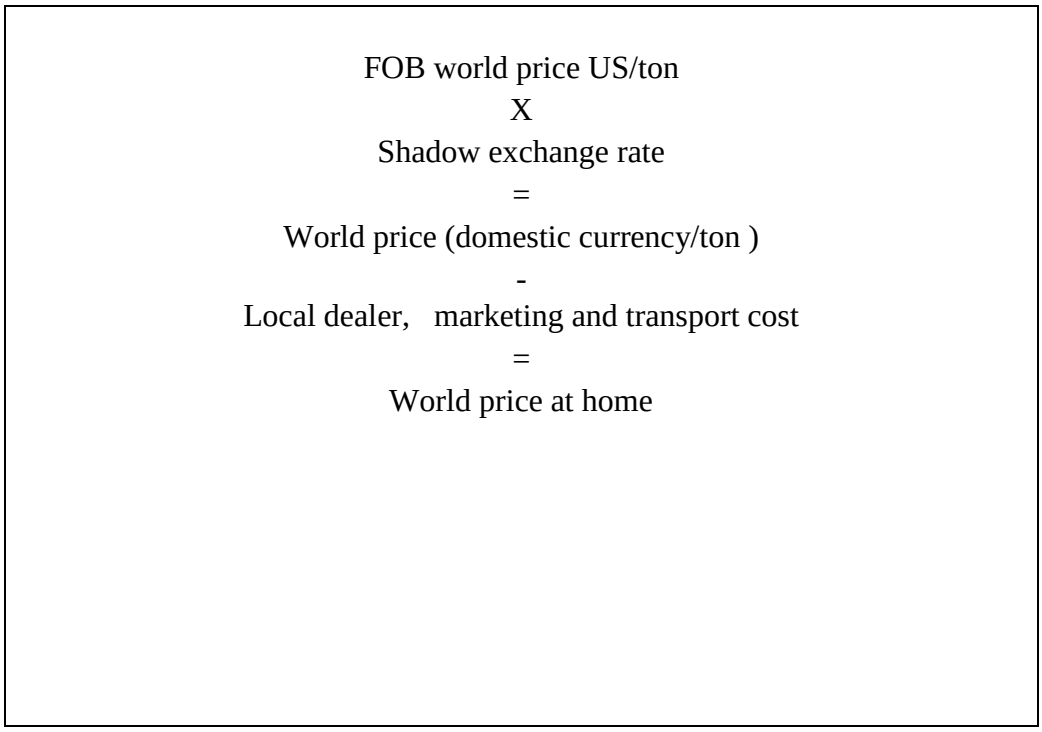

Fig. **2**. The export parity price
Source: Idris (1993)

The directly applied border prices are not common in practice; instead, it is recommended to calculate the accounting ratios for basic commodities and inputs first and then apply them directly to transform market prices into accounting prices.
Accounting price = Market price x Accounting ratio.

Social prices for domestic factors are presented by the marginal value products of factors, evaluated at world prices, and the social prices of non-tradable outputs are equal to the sum of social costs of producing the non-tradable goods and the social prices for domestic factors. Social prices for domestic factors could be calculated by direct valuation of the marginal products at world prices.

The labor accounting ratio is estimated for each group, where the common groups in developing countries are skilled urban, unskilled urban and unskilled rural labor. The accounting wage rate is calculated as:
AWR = Market wage rate x accounting ratio (Gethinger, 1982).

The rate of shadow wage can be computed by multiplying market wage times the appropriate transfer rate of each type of labor. For skilled labors its transfer rate equal one since it is scarce in its supply. For unskilled labor, it is 0.6 due to lack of full employment and seasonality and differentiation in labor wage locally.

The accounting price of land is opportunity cost, given by its marginal product in the best alternative use valued at border price plus a component reflecting its function as a depository of value. In other words, the land accounting price is estimated by net

benefits without investment multiplied by the appropriate accounting ratio (Pearson and Monk, 1987).

The accounting price of capital is estimated by the social rate of return. The appropriate rate may be fixed by the central financial or planning authorities.

The private profitability calculations show the competitiveness of the agricultural system. Foreign exchange earnings and imported inputs are converted into local currency by the actual exchange rate at which the market operates. The private profits are the difference between revenues and costs measured in actual prices. If the private profits are negative, operators are earning subnormal returns and thus can be expected to exit from this activity unless something changes to increase profits to at least a nominal level. Positive profits are an indication of supernormal returns and should lead to future expansion of the system. Private profitability from a government's point of view is the border price of crop less production and marketing costs, while private profitability for producers is the farm gate price minus production costs.

Many coefficients could be drawn from the PAM results. These include the international value added (IVA), nominal protection coefficient (NPC), domestic resource cost (DRC) and coefficient of international competitiveness (CIC). In these contexts, IVA and CIC are used as competitiveness indicators.

The international value added is an absolute measure of international competitiveness defined as the revenue of the crop less imported inputs expressed in foreign currency, IVA=E – F as shown in table 1. A positive IVA means positive foreign exchange earning or saving.

The CIC reflects the ratio of the cost of local resources needed to give one unit of hard currency. The CIC is the relative competitiveness of crops, defined as the ratio of domestic resources cost measured in economic prices to international value added expressed in foreign currency, CIC= G/IVA. If the CIC is less than exchange rate, the commodity is economically profitable and vice virsa if it is greater than exchange rate.

Table 1. PAM structure

	Revenues	Total Cost		Profits
		Tradable inputs	Non –tradable Inputs	
Private Prices	A	B	C	D
Social Prices	E	F	G	H
Transfers	I	J	K	L

(1) Private or Financial Profits, D = A – B – C
(2) Social or Economic Profits, H = E - F - G
(3) Output Transfers, I = A – E
(4) Input Transfers, J = B – F
(5) Net Transfers, L = D – H = I – J – K
Ratio Indicators for deferent systems:-
-International Value Added (IVA) = E- F
-Coefficient of International Competitiveness (CIC) = G /IVA
-Nominal Protection Coefficient :
On output (NPCO) = A/E
On input (NPCI) = B/F
Source : Pearson and monk (1987)

RESULTS AND DISCUSSION

Saudi Arabia is the main market for the Sudanese mango. It absorbs more than 75% of the overall exports followed by Syria, Lebanon, Jordon, United Arab Emirates and Qatar. The countries that compete with Sudan are Yemen, Egypt, India, Brazil and South Africa.

Table 2. The mango fruit exports for 2004 – 2012 (volume in metric tons, value in US$)

Year	Volume	%	Value	%
2004	2507	66.9	762.4	60.8
2005	2202.6	48.6	660.50	48.6
2006	1249.1	47.2	373.30	22.9
2007	1286.5	58.1	383.80	45.4
2008	140953.1	99.3	1053.9	74.5
2009	2142	46.7	784	54.8
2010	1417	27.9	645	33.1
2011	1855.2	26.1	1176.4	42.5
2012	3334.5	24.7	2614.3	34

Source: Sudan Custom Authority (2012).

Mango production in Sudan needs very little agro-chemicals thus, the mango is relatively free of chemical residues, which, if certified, could give comparative advantage in international markets. Table 3 shows the mango export budget 2012. The data were collected from Abu Halima village, East Nile Locality, Khartoum State and the Khartoum central market.

Table 3. Mango exports budget (2012)

Item	SDG/	metic	Percentage

	ton	
a) Costs/MT		
1- Purchase price	3375	9.32
2- Carton	1417.5	3.92
3- Selection and Packing	1125	3.11
4- Export boxes	10800	29.48
5- Bank of Sudan fees	2605.5	7.20
6- Storage	270	0.75
7- Handling	270	0.75
8- Transportation	540	1.49
9- Airport fees	1485	4.10
10- Freigh and handling	14310	39.53
Total cost	36198	100
b) Revenues		
Mango FOB price (Khartoum Airport) MT	8337.6	
Gross revenue	75038	
Resale of Exporter empty carton	42215	
Net revenue	40257.5	

Source: Field survey (2012).

The average mango FOB price (Khartoum airport) is about 8337.6 SDG per metric ton, The price of empty carton about 1417.5 SDG, the exporter gross revenue, which is about 75038 SDG per metric ton, the marketing costs which include local trader expenses, marketing cost, labor cost and transportation cost are about 3017.8 SDG per metric ton which is equal to about 8.34% of the total cost (Table 4). The net margin is about 38840 SDG per metric ton. Table 4 presents the mango parity price. The mango trader was taxed as he sold the metric ton at 3375 SD at Abu Halima village compared to calculated world price at Abu Halima of about 5319.8 SDG per metric ton, i.e. NPC is less than one (equal 0.63) .

Table 4. Mango export parity price per M.T, (2012)

Khartoum airport FOB price	1440US$
	X
Exchange rate	5.79SD/US$
(equal)	=
World price or export border parity price	8337.6
(less)	-
Local trader expenses, marketing cost, labor and transportation cost	3017.8
(equal)	=
World price at Abu Halima	5319.8
Trader NPC = 3375/5319.8 = 0.63	

Source: Calculated by the authors

Table 5. PAM, 2012

Itmes	Foreign compon-ent	Financial value		Total	Convers	Economic value		Total
Exported mango	1	8337.6	0	8337.6	1	8337.6	0	8337.6
Sale of empty	0	0	1417.5	1417.5	1	0	1417.5	1417.5
Gross revenue								
Less export costs								
1- Purchasing price	0	0	3375	3375	1	0	3375	3375
2- Airport fees	0	0	1485	1485	1	0	1485	1485
3- Local carton	0	0	1417.5	1417.5	1	0	1417.5	1417.5
4- Freight and handling	0.8	11448	2862	14310	1	12358	2862	15220
5- Export boxes	0.9	9720	1080	1080	1	10492	1080	11572
6- Selectionand packing	0	0	1125	1125	1	0	1125	1125
7- Transportation	0.7	378	162	540	1	408.03	162	570
8- Handling in local market	0	0	270	270	1	0	270	270
9- Bank of Sudan fees	0	0	2605.5	2605.5	1	0	2605.5	2605.5
10- Storage	0.2	54	216	270	1	58.29	216	274..3

Source: Field survey 2012

The freight and handling, export boxes, transportation and storage constitute foreign component estimated to be about 80%, 90%, 70% and 20% of their costs, respectively.

Profitability of mango

The private profitability (PP) of mango is equal to border value minus production and marketing cost valued at market price.

Economic profitability (EP) is derived by taking total revenue at economic prices and deducting tradable inputs and domestic resource costs valued at economic prices.

Table 6. Private and economic profitability (SDG/fed) for mango exports during the period 2005–2012

Year	Private Profitability (PP)	Economic Profitability (EP)
2005	8740.55	12622.7
2006	8740.13	19227.54
2007	8640.13	13357.02
2008	9303.10	13625.36
2009	10827.33	15932.86
2010	10560.12	14910.02
2011	16930.13	17120.63
2012	28826.13	46520.75

Source: Estimated by the Authors 2012

Table 6 shows the results of private and economic profitability for the period. The empirical finding show that both private and economic profitability, throughout the period under evaluation, 2005–2012 in SDG/fed, were positive. Such results indicated that relatively favorable farm gate pricing policies were used to encourage mango exports. Both indicators, private profitability and economic profitability, showed steady and remarkable increase through the seasons 2005– 2012 where economic profitability exceeded private profitability, because the government taxed the tradable inputs. Table 7 shows the PAM results of exported mango in 2012.

Table 7. Revenue, costs and profitability of mango exponts in 2012

	Revenue	Costs		Profits
		Tradable inputs	Non tradable inputs	
Financial Prices	30375	167.3	1381.6	28826
Economic Prices	47878	180.6	1177.1	46521
Divergences	-17503	-13.3	204.49	- 17965

Source: Derived by the authors 2012

NPC = 0.63

CIC = 0.14

IVAUS$ = 8238

The financial profitability of mango exports (Table 6) was positive, (about 28826 SDG), and economic profitability was positive too. Economic profitability exceeded the private profitability by about 17965 SDG, implying that the economic system taxed the private sector. The excess tax accredit was obtained through the non-tradable inputs. The

implicit tax was estimated at about 17503 SDG. The tradable inputs were subsidized by about 13.3 SDG. However, this amount of subsidy has been so minimal that it could not offset the combined effect of the implicit foreign exchange tax and the direct and indirect net taxes on non –tradable inputs

The positive profitability, in all years throughout the study (2005-2012), indicated that mango is still and will remain a competitive commodity.

To measure the exact rate of taxation, NPC and EPC were calculated. The NPC only indicates the effect of policy on mango prices. The EPC considers the effect of implicit taxes and subsidies on mango exports and at the same time the explicit ones.

Table 8. Nominal and effective production coefficient (NPC and EPC) for mango exports in the Sudan during the period 2005 – 2012

Year	NPC	EPC
2005	0.74	0.73
2006	0.49	0.48
2007	0.67	0.68
2008	0.72	0.71
2009	0.70	0.69
2010	0.74	0.73
2011	0.99	0.99
2012	0.63	0.63

Source: Estimated by the authors 2012

At the national level, the nominal protection coefficient (NPC) was less than one, indicating that the Sudan government is taxing mango exports. The highest national tax was in the crop season 2006 and was equal to 51% (NPC of 0.49 indicates a 51% tax in output) followed by 37% in 2012 and 34% in 2007, while the lower tax was 1% in 2011 (Table 8).

The effective protection coefficient (EPC) was lower than the nominal protection coefficient (NPC), suggesting that the crop is taxed at a rate higher than the explicit taxes of final outputs. This implied that both outputs and inputs are suffering from negative protection throughout the period of the study. The effective tax was higher than the nominal one, except in 2011 and 2012 where they were equal.

International competitiveness of mango exports used both the absolute competitiveness, domestic resource cost (DRC) and coefficient of international competitiveness (CIC) and relative competitiveness the international value added (IVA).

Table 9. Relative competitiveness of mango exports for the period 2005 – 2012

Year	DRC	CIC
2005	0.04	0.09
2006	0.04	0.08
2007	0.06	0.12
2008	0.05	0.11
2009	0.04	0.09
2010	0.06	0.13
2011	0.06	0.14
2012	0.02	0.14

Source: Estimated by the authors 2012.

The DRC for mango exports in Sudan gives the amount of foreign exchange earning when a unit of domestic resources is used for its production and export (Table 9). The DRC was found less than one, implying that the Sudan has a comparative advantage in producing and exporting mango as it has generated more value added when using domestic resource. It was more competitive in 2012, followed by 2005, 2006 and 2009 (the same value). CIC for 2006 was highly competitive relative to other seasons, but seasons 2011 and 2012 appeared to be least competitive compared with other seasons. DRC and CIC proved that mango was competitive at both level of exchange rates. This proved that mango was internationally competitive at the prevailing international prices. The absolute competitiveness of mango exports, which was measured by the IVA per feddan as shown of (Table 10), reflected the foreign exchange earning.

Table 10. International value added (IVA US$/feddan) for mango exports for the period 2005 – 2012

Year	IVA
2005	5394
2006	2914
2007	7042
2008	6890
2009	7123
2010	6884
2011	7224
2012	8237

Source: Estimated by the authors 2012.

The results revealed that the crop was absolutely competitive with fluctuating positive IVA per feddan. The positive values indicated positive exchange earning in the production and export of mango. It was clear that mango export in season 2012 was highest among other seasons.

CONCLUSIONS

Besides their role in agricultural policies, the policy analysis matrix (PAM) coefficients are valuable competitiveness indicators. Mango is found competitive.

The international competitiveness for mango showed positive exchange earnings. Exported mango CIC less than exchange rate, this indicates that the mango is economically profitable and internationally competitive. The mango exporters NPC were less than one implying that the government was taxing the mango at fluctuating rates.

RECOMMDIATIONS

1- Improvement of productivity per feddan through the introduction of new high quality varieties
2- Estabishment of special farms which produce mango for export
3- Improvement of roads in the production regions specially access roads
4- Exemption mango from taxes
5- Reduction of the cost of air transport by interference of government to provide special air cargo planes

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